ABSTRACT

A method is described for reducing the space width of holes in a first resist pattern and simultaneously removing unwanted holes to change the pattern density in the resulting second pattern. This technique provides holes with a uniform space width as small as 100 nm or less that is independent of pattern density in the second pattern. A positive resist is patterned to form holes with a first pattern density and first space width. A water soluble negative resist is coated over the first resist and selectively exposed to form a second patterned layer consisting of water insoluble plugs in unwanted holes in the first pattern and a thin water insoluble layer on the first resist pattern in unexposed portions. The plugs may form dense and isolated hole arrays while the thin insoluble layer reduces space width to the same extent in remaining holes in the second pattern.